3.1.2 Water Resources

This section considers water resource availability in both the surrounding area and the immediate site vicinity of TMC's Project in Soledad Canyon. The Santa Clara River is the only existing source of water practically available to the Project for use in mining, aggregate processing, and concrete production. Potential residential development in the Project vicinity may result in a source for reclaimed water. If a source for reclaimed water was available and environmentally and economically practical, TMC would consider using reclaimed water for the Project.

3.1.2.1 Affected Environment

Regulatory Setting

The Santa Clara River, which flows generally westward through the southeast corner of TMC's Project area, is the only practically feasible source of water available to the Project. It is thus essential to recognize that water available to the Project depends significantly on the amounts of water used and the rights of those who are using waters both upstream and downstream of the Project site. The rights of various types of water users must therefore be specifically recognized and will be enforced as necessary by the State's regulatory agency.

The State of California has enacted a comprehensive regulatory framework in the California Water Code and implementing regulations through which the State Water Resources Control Board (SWRCB) allocates, regulates, and otherwise controls the use of surface water throughout the State including within the Santa Clara River. The SWRCB has several functions including administration of the water permit and licensing system, and enforcement of conditions of the permit and license. It is empowered to revoke permits and licenses if conditions are not met. The SWRCB also presides over statutory adjudications of regional water availability and functions as a referee in water rights conflicts (SWRCB 1987b). The SWRCB administers not only the water rights program but also the State's water quality functions. The SWRCB thus enforces pollution control standards through nine regional water quality boards located throughout the State (SWRCB 1989). The remainder of the regulatory discussion in this section is concerned with the SWRCB's function with respect to water rights. Water quality issues are discussed in a separate section of the EIS (Section 3.1.4).

The SWRCB mandates that, "Unauthorized taking of water is illegal and could result in court action, including fines" (SWRCB 1989:7). However, it should be noted that all taking of water requires a permit or specific authorization, depending on the type of water right under consideration. For example, permits are not required to exercise riparian rights. Thus, differences must be recognized in TMC's use of riparian rights versus appropriative rights and how each pertains to TMC's proposed overall use of water from the Santa Clara River in Soledad Canyon.

The Division of Water Rights, SWRCB, has determined that there was a sufficient basis to process three Water Rights Applications (29898, 29967, and 30498) filed by TMC and others that seek to appropriate water from wells near the Santa Clara River (SWRCB letter, dated October 9, 1999).

Definition of Riparian and Appropriated Water

Two primary doctrines govern the allocation of surface water rights in California: (1) the riparian doctrine and (2) the doctrine of prior appropriation. For purposes of these doctrines, "surface water" includes ". . . subterranean streams flowing through known and definite channels" (SWRCB, 1987b, Water Code 1200). Accordingly, when referring to the riparian right to surface waters adjacent to a particular land parcel, the term "surface waters" specifically includes the subterranean flow (also referred to as the underflow or subsurface flow) flowing in the associated "known and definite channel" below the surface of the streambed. This important definition of surface waters applies equally to the appropriation of surface waters as well as to exercising riparian rights in the use of surface waters.

Riparian water refers to water taken in accordance with the doctrine of riparian rights to use water. The riparian right is one that is part of a parcel of land that abuts a river, stream, lake, or pond. Thus, and unless otherwise surrendered, riparian rights are acquired as a specific property right when certain types of properties are acquired. A very significant feature of riparian rights is that use of surface waters (as defined above) on the basis of a riparian right has priority over use of water on the basis of appropriative right. Moreover, the taking of water on the basis of a riparian right does not require a permit. However, important characteristics limit the use of riparian rights as discussed following a brief contrasting definition of the doctrine of prior appropriation and appropriative rights to the use of surface waters.

Appropriative rights to use of surface waters (as previously defined) are acquired rights to use water without regard to the continuity or proximity of a given parcel of land to the water being appropriated. Thus, an appropriative right is not acquired by virtue of the acquisition of a parcel of land adjacent to or abutting a stream, river, or water body (as in the case of riparian rights). An appropriative right to use surface water is acquired by means of an Application to Appropriate Unappropriated Water submitted to the SWRCB.

A successful application for appropriation of water must meet a number of critical conditions including the requirement that the water will be beneficially used (based on a determination by the SWRCB) and that the amount of water for which the application makes a request can be considered reasonably necessary. When an appropriation is granted, beneficial use of the water must begin within a specified time, and disuse of an appropriation may result in loss of the appropriation. In general, however, riparian rights cannot be lost by disuse.

It is most important to recognize that an appropriative right to use surface water is subordinate to riparian rights. Moreover, the amount of water that can be used in accordance with a riparian right is not quantitatively limited (so long as it meets the requirement for beneficial use). However, the riparian user must generally share available surface water with other riparian users if there is a water shortage.

Conditions Imposed on Use of Riparian Rights

A number of conditions must be recognized in exercising riparian rights. The following list is intended to highlight some of the more significant conditions relative to the Project's use of surface waters of the Santa Clara River by TMC for its Soledad Canyon Project:

- Riparian rights include surface waters and waters flowing in known and definite subterranean channels but do not include groundwater rights (groundwater rights pertain to underground water not flowing through known and definite channels such as subsurface waters often occurring in groundwater basins).

- The riparian right to take water is unquantified and extends to the use of as much water as can be reasonably and beneficially used on the parcel of land to which the riparian right attaches.

- Because a riparian right is a shared right, available water must be shared with other riparian users. In the event of water shortage, the shortage is also shared with the other riparian users.

- The riparian right is generally paramount and must be satisfied before any appropriative right is exercised. This paramount right includes not only present uses but also reasonably anticipated future uses.

- No governmental permission or permit is required to exercise the riparian right, although riparian users are required to file a Statement of Water Diversion and Use with the SWRCB (diversion means taking water from a surface stream or subterranean stream flowing through a known and definite channel into a canal, pipeline, or impoundment). Failure to file a statement has no legal consequence whatsoever (SWRCB 1987b, Water Code 5100-5108).

- Water taken under riparian right cannot be stored and held for deferred use (beyond 30 days) or from one season to another without a permit.

- Unlike appropriative rights, riparian rights cannot be lost by nonuse or abandonment, but a parcel of land can lose its riparian right when severed from land bordering the stream (unless the right is reserved for the severed parcel).

- Riparian rights cannot be used to take water for municipal purposes.

- The SWRCB must make a determination of water available for appropriation. When in the public interest, the SWRCB must take into account the amount of water required for preservation of fish and wildlife resources. However, in making such a determination, this requirement of the Water Code is specifically prohibited from being construed to affect riparian rights (SWRCB 1987b, Water Code 1243).

- Moreover, a similar prohibition exists against construing the SWRCB's requirement to consider amounts of water required for a water quality control plan as applying to riparian rights when determining the amount of water available for appropriation (SWRCB 1987b, Water Code 1243.5).

Conditions Imposed on Obtaining Permit and License for Appropriative Use of Surface Waters

As previously suggested, the permitting system for use of appropriated water is quite different from conditions imposed for legal exercise of riparian rights in the taking of water. A number of the most important considerations are identified below.

- In filing an application for appropriation for a permit and license to use surface waters, the same definition of surface waters applies as in the case of riparian rights. Thus, the appropriative right includes surface flows and subterranean flows in known and definite channels.

- Underground water not flowing in a subterranean stream, such as water percolating through a groundwater basin, is not subject to the SWRCB's jurisdiction. Owners of lands overlying a groundwater basin have a first right to withdraw water for reasonable beneficial use on the overlying lands; thus, such rights are similar to riparian rights pertaining to surface waters (SWRCB 1990:10).

- In an application for appropriation of surface water, the amount of water must be specified. The use of water must be justified as being reasonable and in the public interest, as well as being of beneficial use (all of these items are matters for determination by the SWRCB).

- When a river system has been declared by the SWRCB to be fully appropriated, the SWRCB will not generally accept additional applications for filing and may cancel those on file (SWRCB 1987b, Water Codes 1205 and 1206). The SWRCB has not determined the Santa Clara River to be fully appropriated and thus continues to accept applications.

- If and when a permit for appropriation of water is issued pursuant to an application, the SWRCB will indicate the specific period for project development and use of water to be allowed. Subsequently, the project is inspected by the SWRCB's staff for water rights for purposes of final licensing.

- Water taken in accordance with an appropriative right may be stored for deferred use without further authorization from the SWRCB (in contrast to the general prohibition of storage of water taken under riparian law) so long as all appropriation permit and licensing conditions are met, particularly in reference to reasonable and beneficial use and use at the permitted level of use. However, the SWRCB, in exercising its discretionary authority respecting applications to appropriate water, may include terms and conditions that would require periodic releases of diverted and stored water, especially in relation to possible requirements for protection of fish or wildlife habitat or to meet water quality objectives (SWRCB 1987a:74.5).

- The SWRCB is required to consider the possible water requirements for fish and wildlife preservation in determining availability of water for appropriation and may be required by law to strictly divert water or divert and store water for later release in support of fish or wildlife preservation (SWRCB 1987b:31; Water Code 1257.5). In the case of applications for permit to appropriate water, the SWRCB ". . . shall notify the Department of Fish and Game of any application . . ." received and specifically, "The Department of Fish and Game shall recommend the amounts of water, if any, required for the preservation and enhancement of fish and wildlife resources and shall report its findings to the board. This section shall not be construed to affect riparian rights" (SWRCB 1987b, Water Code 1243).

  It is clear that processing an application to appropriate and permitting an appropriative water right involve significant and direct participation of the CDFG, whereas the taking of water under riparian rights involves the CDFG in a much different manner.

- The SWRCB grants a permit for the appropriation of water with terms and conditions to assure available water for instream maintenance and downstream users with prior rights including the restriction and curtailment of water use when necessary to assure those rights will not be adversely affected such as might occur in a drought or low flow year. Additionally, all permits are granted with the condition that the SWRCB reserves the jurisdiction to modify the permit in case of problems resulting from the appropriation of water with relation to instream maintenance or downstream users with prior rights.

- Appropriative rights also may be lost or adjusted downward through total or partial disuse of the permitted and licensed amount of water, or if the water is not being used for purposes for which the appropriation was made.

Function of SWRCB in Water Rights Disputes and Enforcement of Priorities

It is recognized that the right to use water is a property right and may be protected against infringement by appropriate court action. The SWRCB has the authority to determine the validity of appropriative rights (initiated since December 1914), but it does not have the authority to determine the validity of other vested rights (e.g., riparian rights). However, the SWRCB does regularly assist the courts in determinations such as (1) investigation and enforcement of alleged violations of conditions of a permit or license issued by the SWRCB, (2) complaints of waste or unreasonable use of water, and (3) illegal diversion or taking of water, questions of effects on public trust, or interest raised in uses of water.

Most importantly, the SWRCB may make a determination (in accordance with procedures established in the Water Code) of all rights to water in a stream system, regardless of whether such rights are based on appropriation, riparian right, or other basis of right (SWRCB 1987b, Water Code 2501). The process by which the comprehensive determination of all water rights in a system is made is referred to as statutory adjudication. After the SWRCB makes a report and preliminary order of determination, extensive hearings are held in which objections of claimants or all parties in interest are heard. After the hearings, the SWRCB adopts its final order of determination and after further hearings, if necessary, the SWRCB files its order together with original evidence and testimony with the superior court of the county in which the stream system is situated. After required hearings and mandated procedures, the court enters a decree determining the right of all persons or parties involved in the proceeding. The decree is deemed to be conclusive as to all existing water rights claimants upon the stream system embraced in the determination (SWRCB 1987b, Water Codes 2550-2774).

The SWRCB is also called upon to act as "referee" in disputes over water rights. In such cases, the SWRCB may make a recommendation concerning the decision to be resolved in the entire case in dispute, or the SWRCB may simply provide answers to questions of fact in the dispute. The SWRCB issues a report to all interested parties, and it may hold a hearing; in any event, the SWRCB's report then becomes evidence to be heard in court (SWRCB 1987b).

Responsibilities of U.S. Fish and Wildlife Service and California Department of Fish and Game Regarding Regulation of Water Resource Use

As discussed above, the SWRCB is required to advise the CDFG when an application to appropriate surface water is received. The CDFG in turn is required to ". . . recommend the amounts of water, if any, required [to be considered by the SWRCB in evaluating water availability for appropriation] for the preservation and enhancement of fish and wildlife resources and shall report its findings to the board." As previously indicated, such a procedure is not in force with respect to riparian rights; in fact, the water code specifically states that the foregoing ". . . shall not be construed to affect riparian rights" (SWRCB 1987b, Water Code 1243).

It should not be inferred, however, that the CDFG does not concern itself with the taking of water under riparian rights. The CDFG will receive a copy of the EIS, and it would be expected to review and comment on the proposed taking of water by TMC for its Project, whether the water is taken under riparian law or by appropriation. The USFWS will also receive a copy of the EIS and will be concerned with the proposed taking of water from the standpoint of possible impacts on the habitat of the unarmored threespine stickleback fish in lower Soledad Canyon. TMC's plans for protecting stickleback habitat, including specific mitigation measures to be taken if Project water use is responsible for a threatening low-water situation, are detailed in Section 3.1.8 (Biota).

Summary of Regulatory Framework

TMC proposes to use water from the Santa Clara River for mining, aggregate processing, concrete production, dust suppression, and fines placement. TMC will exercise riparian water rights for a portion of the water necessary for the Project. Additionally, TMC has applied to the SWRCB for a permit to appropriate water for the Project. The final review of this application will occur following completion of the EIS. In permitting an appropriative water use application, the SWRCB makes a finding that water is available for instream maintenance and downstream water users with prior water rights. The finding of adequate water is based on available hydrologic data for the area and the records of current water users. An applicant must demonstrate that the amount of water to be appropriated would not negatively impact downstream users with prior rights or instream maintenance. A permit is granted with terms and conditions to restrict and curtail water use, when necessary, to assure water for instream maintenance and recognized downstream users such as may occur in drought or low-flow years. All permits are granted with the condition that the SWRCB reserves the jurisdiction to modify the permit in the case of problems with water availability for instream maintenance or downstream users with prior rights.

As part of the permitting process for appropriating water, the SWRCB is required to notify the CDFG and consider the instream requirements of fish and wildlife. Specifically, under state and federal law protecting endangered species, the CDFG and USFWS must review any permit project plans and mitigation measures for potential impacts on the endangered unarmored threespine stickleback. Any relevant mitigation measures resulting from the state or federal environmental permitting process would be included as conditions for the SWRCB permit for appropriation of water.

Surrounding Area

Water Resources Evaluation

TMC's Project site is located in the upper portion of the Santa Clara River Valley about 60 miles east of the mouth of the river at the City of Ventura. The headwaters of the river rise in the Aliso and Kentucky Springs Canyons about 20 miles east of the site on the north-facing slopes of the San Gabriel Mountains. The California Department of Water Resources has administratively divided the Santa Clara River into hydrologic units, subunits, and subareas delineated principally on the basis of topography, geologic features, and watershed divides. That portion of the Santa Clara River Valley within Los Angeles County has been divided into the Acton Valley and Eastern Subunits. The Eastern and Acton Valley Subunits are directly relevant to this discussion of the setting of TMC's point of diversion, which is located in the Acton Valley Subunit near the boundary of the Eastern Subunit.

Figure 3.1.2-1 shows the location of the Project site in relation to the Acton Valley and Eastern Subunits. The Acton Valley is generally a sparsely settled rural area characterized by rugged hilly and mountainous terrain. The Eastern Subunit is, in its central portion, a comparatively densely developed suburban and urban area occupying far less rugged valley and hilly terrain. A significant measure of the difference in the upstream (Acton Valley) and downstream (Eastern Subunit) portions of the surrounding area is the fact that a significant percentage of the population in the Acton Valley Subunit is dependent on individual pumps for its domestic water supply. Only one small water system serves a limited part of the Acton Valley Subunit. In the Eastern Subunit, the vast majority of water users are served by one or another of the four water systems serving the area. More detail on water use in the two parts of the surrounding area is provided below, along with the discussion of the sources of the available water supply.

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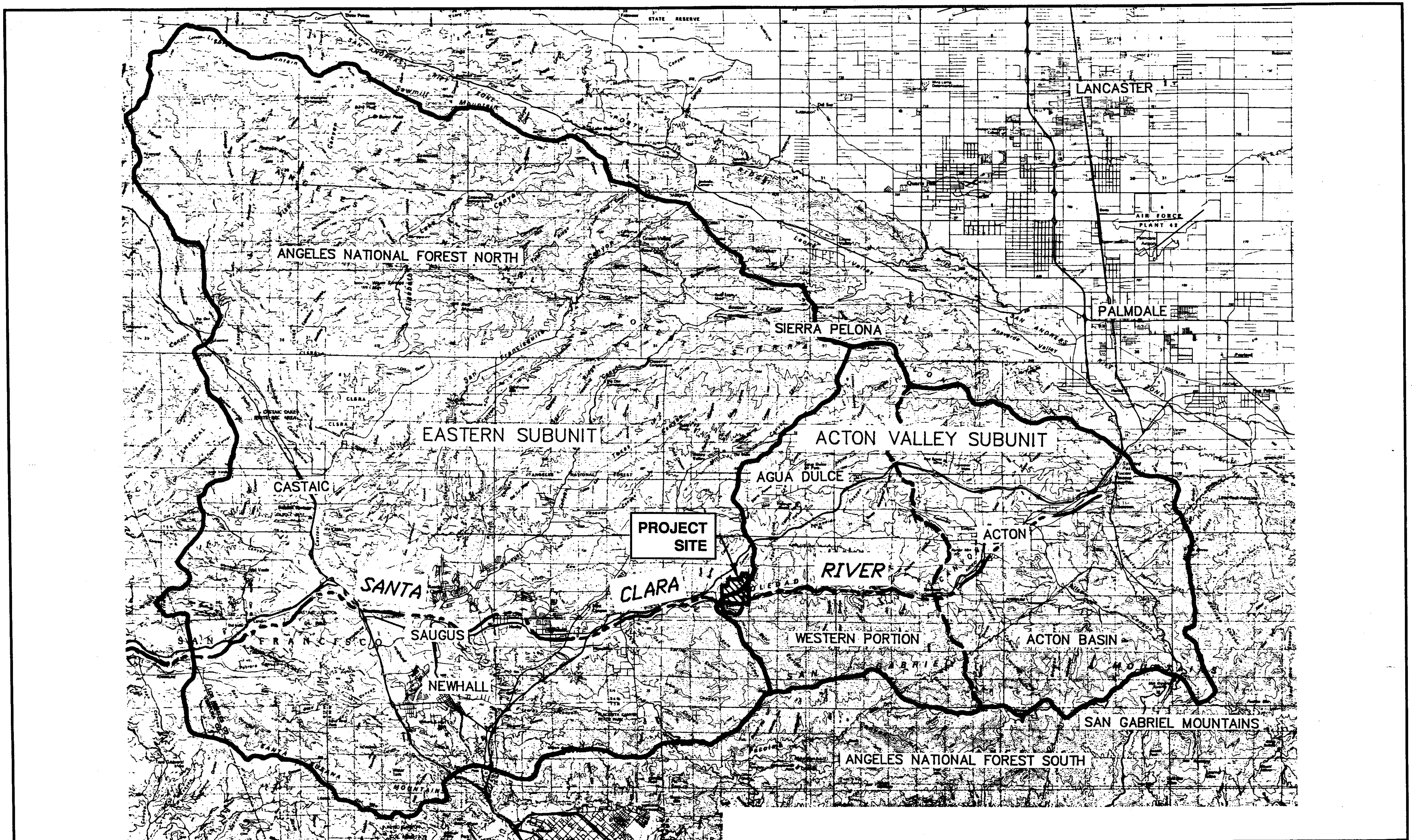


Source: USGS 1:200,000 series
Los Angeles, and Lancaster, CA

PROJECT SETTING
Figure 3.1.2-1

Acton Valley Subunit

The Project site is situated on the north side of the Santa Clara River on the downstream (westerly) boundary of the Acton Valley Subunit. Figure 3.1.2-2 provides a larger-scale depiction of the Acton Valley Subunit. The Acton Valley Subunit extends about 13 miles in an east-west direction and typically measures about 11 miles in a north-south direction. The southern boundary of the Acton Valley Subunit extends along the crest of the western San Gabriel Mountains, and the northern boundary is essentially along the divide of the Sierra Pelona. The eastern portion of the Acton Valley Subunit is defined as the Acton Basin, based on geologic features. Unless otherwise indicated, the term Acton Valley Subunit will henceforth be the only term used to refer to the entire administrative area. The term Acton Basin will be used only in reference to the smaller basin areas defined geologically.

The total area of the Acton Valley Subunit is approximately 100,400 acres (156.89 square miles). The Acton Basin accounts for 56,275 acres (87.93 square miles) of the total area, and the western portion of the subunit comprises approximately 44,134 acres (68.96 square miles).

The Acton Valley Subunit is shown on the hydrologic map, Figure 3.1.2-3, which is a reduced scale reproduction of Plate I in the GWSI report (1993). The hydrologic map shows the six watershed areas comprising the Acton Valley Subunit. The two eastern watershed areas, "Acton" and "Acton Camp to Ravenna," comprise the Acton Basin as discussed above, and the other four watershed areas comprise the western part of the Acton Valley Subunit. Figure 3.1.2-3 also shows isohyetal lines (lines along which normal annual rainfall is equal) indicating 100-year normal rainfall in inches. The isohyetal lines have been established by the County (DPW, 100-year normal isohyetal map 1872-73 to 1972-73). Precipitation is the major source of water within the entire Acton Valley Subunit. There is no natural surface or subsurface flow into the Acton Valley. However, the Acton Valley is serviced by Los Angeles County Water District 37 (Acton) (LACWD-37), and State Water Project (SWP) water is available to LACWD-37 through the Antelope Valley East Kern Water Agency (AVEK). AVEK is a wholesaler of SWP water and supplies LACWD-37 on an "as-needed" basis.

<u>Precipitation on Acton Valley Subunit</u>

The climate of the Acton Valley Subunit is defined as a semiarid or Mediterranean-type climate having a wet and mild or cool winter and a hot, dry summer season with occasional thunderstorms over the higher mountains. The rainy season is generally considered to begin in November and extend into April. Summer rains in the form of thunderstorms occur infrequently and usually on high ground. Winter precipitation is largely in the form of rainfall, although occasionally it occurs as snowfall that is generally restricted to the north-facing higher slopes of the San Gabriel Mountains. Snow remains on the ground only a few days except on the very highest ground. Occasionally, snow will blanket the entire Acton Valley Subunit, but it melts quickly.

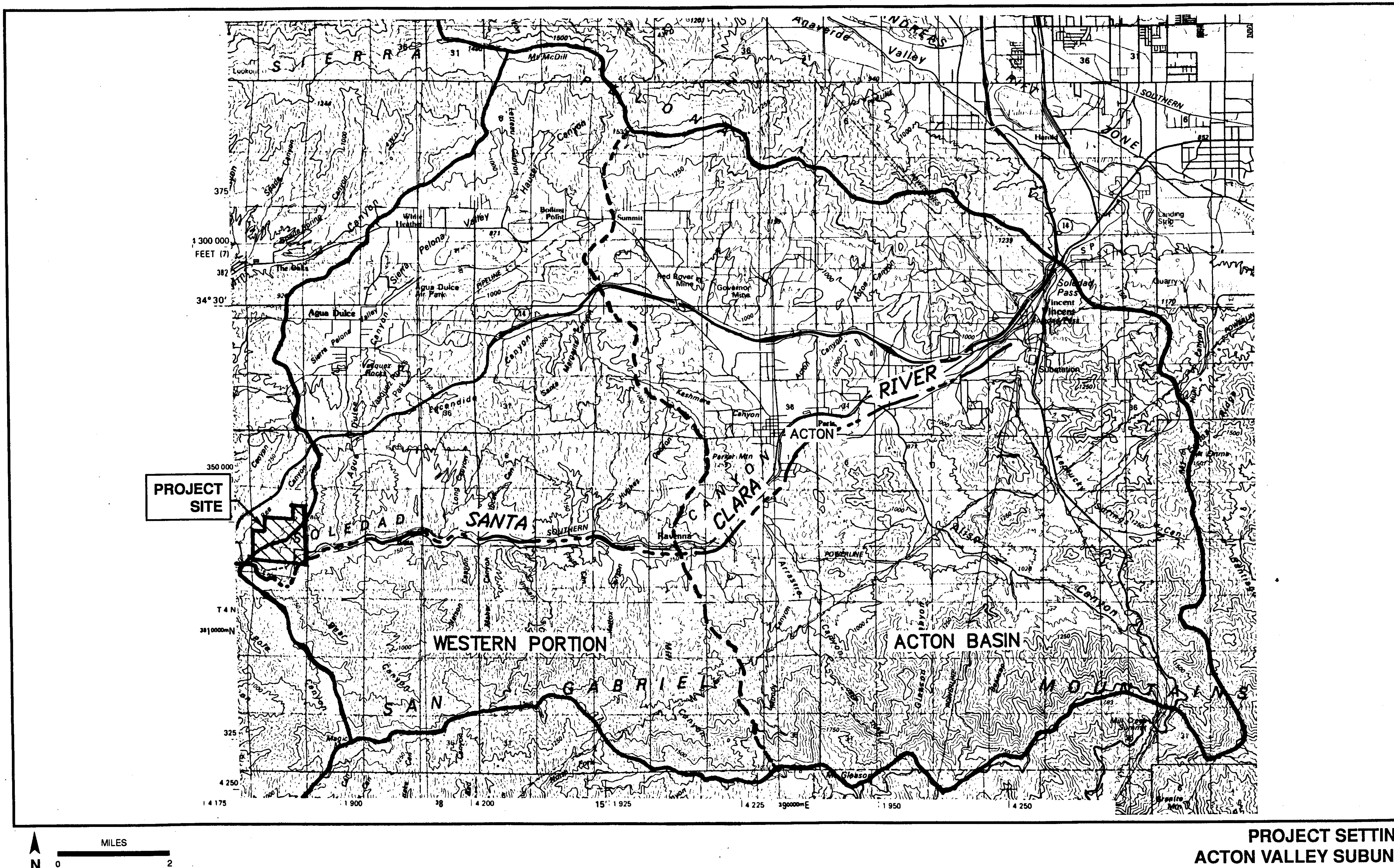
Average annual rainfall varies greatly from year to year and from one part of the Acton Valley Subunit to another. Rainfall over the southern half of the Acton Valley Subunit (and particularly the southwest quarter of the Acton Valley Subunit) provides a disproportionate amount of total potential runoff (whether as surface flow, underflow, or aquifer recharge) within the entire Acton Valley Subunit. This will be shown below to be important in considering the water resource potentially available to TMC. Two major trends should be noted (see Figure 3.1.2-3): (1) long-term average annual rainfall varies northward from about 22 inches per year along the crest of the western San Gabriel Mountains to a range of 9 to 12 inches per year along the northern boundary of the Acton Valley Subunit, and (2) average annual rainfall varies northeastward from about 16 inches per year in the vicinity of the TMC Project site in the western boundary area of the study area to about 9 inches at Soledad Pass at the northeastward limits of the Acton Valley Subunit.

These important trends in the variation of average annual rainfall within the Acton Valley Subunit are explained by two facts. The first is that the level of rainfall is fundamentally influenced by the elevation and orientation of the western San Gabriel Mountains. Second, the Acton Valley Subunit, as a semiarid area, is actually a transition area between the milder area along the coast and the very hot dry, or arid area of the Antelope Valley and Mojave Desert, which are located inland to the north and northeast of the study area. Much of the precipitation falling on the northern half of the Acton Valley Subunit occurs as orographic precipitation: as moisture-laden air moves inland from the coast, it rises over the mountains, which generally results in rainfall as the air crosses the higher ground. As Figure 3.1.2-3 shows, average annual rainfall decreases sharply (to the east) due in part to the rainshadow effect caused by the mountains.

The foregoing review of the isohyetal lines provides an appreciation of the variability in average annual precipitation within different parts of the Acton Valley Subunit. In addition, data presented in Table 3.1.2-1 show the annual precipitation record for four climatogical stations in the Acton Valley Subunit: Acton Camp, Acton Escondido, Soledad Canyon, and Magic Mountain. The locations of these (and other) stations are indicated on Figure 3.1.2-3.

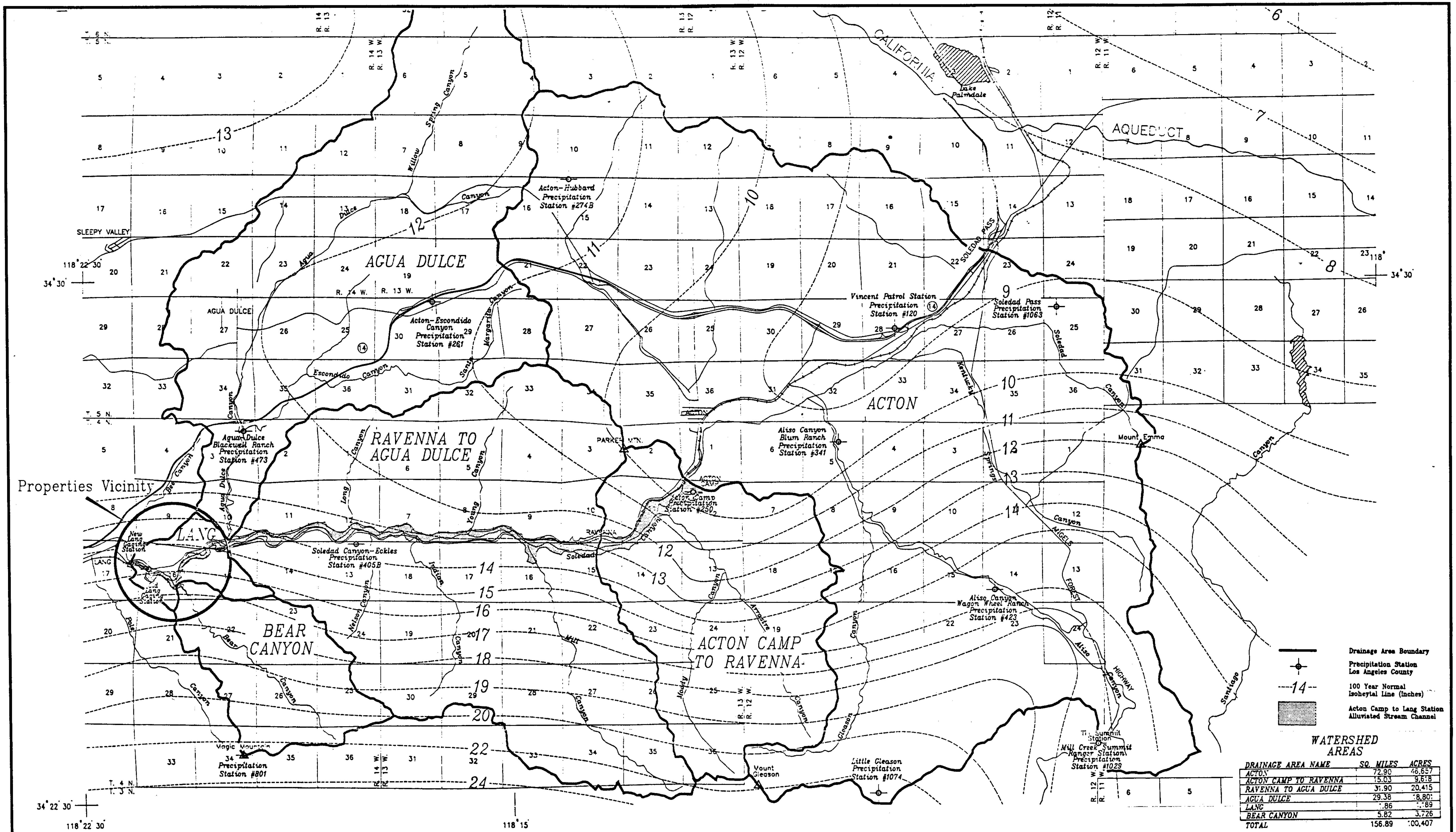
Table 3.1.2-1 indicates variability in annual rainfall over a 37- to 43-year period (depending on which station is examined). Table 3.1.2-2 provides a summary comparison of long-term average annual rainfall, as well as the recorded maximum and minimum annual amounts of rainfall for each of the stations. Note that the above-average annual rainfall occurs about half as frequently as below-average rainfall for all stations. The percentage of annual variation from long-term average rainfall is about the same for each station. For example, the percentage of time that stations have below-average rainfall (by any amount) varies from 63 to 70 percent. Specifically, the frequency (or random probability) of having below-average rainfall drops sharply when the extent of below-average rainfall (as a percent of long-term annual average) is specified. Table 3.1.2-2 shows that a below-average annual rainfall of up to (but no more than) 30 percent ranges in occurrence from 28 to 35 percent of the time. The above representations imply a wholly random occurrence of above- or below-average rainfall regardless of the above- or below-average occurrence over the preceding few years.

The total amount of precipitation falling on the entire Acton Valley Subunit was estimated by GWSI (1993) at 110,773 acre-feet of rainfall, based on the 100-year normal isohyetal map (Figure 3.1.2-3). The procedure followed by GWSI in making this estimate involved a determination of the 100-year average volume of precipitation between isohyetal lines



Source: USGS 1:100,000 series
Los Angeles, and Lancaster, CA

PROJECT SETTING
ACTON VALLEY SUBUNIT
Figure 3.1.2-2



WATERSHED AREAS

DRAINAGE AREA NAME	SQ. MILES	ACRES
ACTON	72.90	46,657
ACTON CAMP TO RAVENNA	15.03	9,618
RAVENNA TO AGUA DULCE	31.90	20,415
AGUA DULCE	29.38	18,801
LANG	1.86	1,189
BEAR CANYON	5.82	3,726
TOTAL	156.89	100,407

N

FEET

0 10,000

Source: Ground Water Systems, Inc.

HYDROLOGIC MAP OF PROJECT SITE VICINITY OF THE SANTA CLARA RIVER HYDROLOGIC UNIT OF THE LOS ANGELES DRAINAGE PROVINCE

Figure 3.1.2-3

Table 3.1.2-1

WATER YEAR DATA (INCHES) FROM FOUR PRECIPITATION STATIONS IN VICINITY OF PROJECT SITE - 1949-1950 THROUGH 1995-1996

Water Year	No. 250 Acton Camp	No. 261 Acton Escondido	No. 405B Soledad Canyon	No. 801 Magic Mountain
1949-50	4.70	6.34	8.73	18.94
1950-51	3.09	3.71	5.26	8.93
1951-52	17.67	20.59	26.38	39.95*
1952-53	6.83	6.14	9.42	11.62*
1953-54	8.16	8.18	12.49	20.82*
1954-55	6.93	8.00	11.53	18.44
1955-56	7.27	9.07	11.03	15.72
1956-57	7.48	8.18	10.68	17.14*
1957-58	16.19	15.18	22.52	40.51
1958-59	6.28	5.42	8.51	11.75
1959-60	2.97	4.10	6.16	9.37
1960-61	4.72	5.05	5.20	10.29
1961-62	12.13	11.66	17.34	26.77
1962-63	7.48	6.77	9.45	13.73
1963-64	5.41	5.57	6.85	11.47
1964-65	7.22	7.83	9.32	NR
1965-66	14.02	13.10	16.37	NR
1966-67	11.24	13.16	20.28	30.45
1967-68	8.29	8.86	11.99	NR
1968-69	18.99	18.94	27.17	NR
1969-70	5.30	6.81	9.06	12.06
1970-71	8.59	9.64	12.57	NR
1971-72	5.19	6.63	7.76	11.09
1972-73	9.24	10.35	16.88	27.20
1973-74	7.22	9.52	12.55	16.61
1974-75	8.77	9.18	12.14	18.77

Table 3.1.2-1 (Continued)

WATER YEAR DATA (INCHES) FROM FOUR PRECIPITATION STATIONS IN VICINITY OF PROJECT SITE - 1949-1950 THROUGH 1995-1996

Water Year	No. 250 Acton Camp	No. 261 Acton Escondido	No. 405B Soledad Canyon	No. 801 Magic Mountain
1975-76	9.40	8.50	11.19	19.09
1976-77	8.39	8.30	10.68	14.70
1977-78	26.96	23.30	34.57	44.80*
1978-79	14.04	15.20	20.29	INC
1979-80	17.42	18.30	23.20	40.14
1980-81	7.23	7.30	9.83	13.21
1981-82	10.90	13.60	16.45	22.60
1982-83	24.30	26.70	36.28	53.18
1983-84	5.79	6.00	6.93	17.70
1984-85	7.85	8.50	10.15	19.86
1985-86	NR	11.88	15.75	32.76
1986-87	5.80	4.74	6.65	9.25
1987-88	14.60	12.21	18.89	17.56
1988-89	---	INC	6.53	18.11
1989-90	---	---	6.90	13.77
1990-91	---	---	14.77	19.68
1991-92	---	---	23.76	35.70*
1992-93	24.6	24.8	33.18	NR
1993-94	6.9	7.7	8.38	14.02
1994-95	16.9	17.5	21.72	46.68
1995-96	6.3	8.6	9.76	22.78
Total	428.76	461.11	673.50	867.22
Years of Record	42	43	47	40
Average	10.21	10.72	14.33	21.68

*Estimated values by reporting authorities as indicated by the DPW
Notes : NR - No record; INC - Incomplete
Sources : GWSI (1993) and DPW Hydraulic/Water Conservation

Table 3.1.2-2

SUMMARY COMPARISON OF PRECIPITATION AT FOUR STATIONS IN ACTON VALLEY SUBUNIT

General Location	No. 250 Acton Camp	No. 261 Acton Escondido	No. 405B Soledad Canyon	No. 801 Magic Mountain
	On River Acton Basin	Agua Dulce 4 Miles North of River	On River Lower Soledad Canyon	West Boundary on Mountain Crest
Average annual rainfall (inches)	10.2	10.7	14.3	21.7
Maximum annual rainfall (inches)	27.0	26.7	36.3	53.2
Minimum annual rainfall (inches)	3.0	3.7	5.2	8.9
Years above average (percent)	32	36	37	30
Years below average (percent)	68	64	63	70
Years below average (percent): (see note) by no more than:				
up to 10 percent	63	59	56	57
up to 20 percent	47	41	47	38
up to 30 percent	28	31	35	32
up to 40 percent	24	21	21	24
up to 50 percent	11	10	19	11

Source : Basic data from GWSI (1993)
Note : Below-average rainfall, of up to (but no more than) the percentages below, given as a percentage of time occurrence.

considering the interval between isohyetal lines (annual rainfall in feet) and the total area between each contour interval (acres). In effect, the summation of the measured areas between all contour intervals and the summation of the volume of precipitation falling between isohyetal lines provide the basis for a simple calculation of the weighted average annual rainfall for the entire Acton Valley Subunit, the relative weighting of differing annual rainfall amounts being established by the amount of acreage within each rainfall category.

The long-term weighted average annual rainfall for the entire Acton Valley Subunit is thus calculated to be 13.24 inches (110,773 acre-feet/100,400 acres x 12 inches/foot). By the same method, the average rainfall for the western portion is 14.22 inches, and the average for the Acton Basin is 12.47 inches. The water crop for the Acton Valley Subunit is summarized as follows:

Location	Area (acres)*	Average Rainfall** (inches)	Water Crop (acre-feet)
Acton Basin	56,275	12.47	58,479
Western Portion	44,134	14.22	52,295
Total Subunit	100,400	13.24	110,774
*Based on GWSI (1993:Plate 1) **Based on GWSI (1993:Table 2.2)			

These figures are important because they provide a basis for comparing annual rainfall at individual stations or within portions of the study area with the overall long-term weighted average for the entire area.

Water Availability in Acton Valley Subunit

Precipitation has been indicated to be the major source of water available in the Acton Valley Subunit. It was also indicated in the detailed discussion of precipitation that the amount of rainfall varies significantly from one part of the Acton Valley Subunit to another. In addition, the following discussion will show that the amount of water practically available or recoverable for productive use may differ significantly from one part of the overall study area to another when considered as a percentage of total precipitation. For example, the average annual precipitation over the entire Acton Valley Subunit yields a total of 110,773 acre-feet of water reaching the ground surface (GWSI 1993). The Acton Basin portion (see Figure 3.1.2-2) accounts for 52.8 percent of the total precipitation (58,479 acre-feet) for the long-term average annual rainfall year, and the western portion accounts for 47.2 percent (52,295 acre-feet).

In addition to the difference in amount of rainfall from one part of the Acton Valley Subunit to another, it is important to note that physiological and geological conditions in the Acton Basin (the eastern portion of the Acton Valley Subunit) are more favorable for the capture and recovery of usable water, as a percentage of total precipitation falling over the area. The Acton Basin has a broad alluvial aquifer that serves to store much of the flow of the Santa Clara River, thus providing an important groundwater basin or subterranean reservoir that holds a substantial volume of water. The downstream limits of the Acton Basin occur at Ravenna and are formed by the narrowing and shallowing of the subterranean river channel such as to create a constriction to downstream flow from the Basin.

The western portion of the Acton Valley Subunit (see Figure 3.1.2-2) has not been characterized as a groundwater basin. Rather, this area has been designated the Soledad Canyon Alluvial Channel. The river flows through a narrow alluvium-filled channel underlain by relatively impermeable bedrock. The main subterranean storage potential along this approximately 9-mile reach of the river between the western boundary of the Acton Basin and the western boundary of the Acton Valley Subunit is that afforded by the alluvium-filled subterranean channel of the river.

As indicated above, precipitation is the major source of water available, and the total amount of precipitation falling on the two main portions of the Acton Valley Subunit for the average annual year has been indicated. Of major importance in this semiarid climate is the determination of potentially recoverable water after careful consideration of the extent of natural water loss. The natural water loss is the sum of the evaporation and transpiration by vegetation. Evaporation is water directly taken up into the atmosphere from the earth's surface by vaporization, and transpiration is water given up by plant life to the atmosphere. The term evapotranspiration is generally used to refer to the combined natural loss of water to the atmosphere by evaporation and transpiration (Crippen 1965).

The residual or recoverable water is that water remaining after deducting the natural loss through evaporation and transpiration from total precipitation. Recoverable water includes water percolating into the underlying groundwater basin or alluvial aquifer, as well as surface and subsurface flows out of the basin. The greater part of precipitation is generally retained as soil moisture for subsequent loss by evapotranspiration, while lesser amounts percolate to the underlying groundwater body or contribute to surface and subsurface flows. The permeability of the soil mantle largely determines how much precipitation will contribute to surface runoff and how much contributes to soil moisture and groundwater recharge. In general, recoverable water ranges from 4 to 12 percent of total precipitation (Crippen 1965).

This definition and discussion of recoverable water as the amount of water remaining after deducting natural loss are important relative to the Acton Valley Subunit and Acton Basin because they provide the only available basis for evaluating the extent of groundwater pumping and use in relation to the overall potential and availability of the water resource. Several studies of the water resource potential in the Acton Basin (not the subunit) have been made in recent years. However, none of these investigations have appropriately evaluated recoverable water as a baseline for assessing the extent of present use relative to total potentials of the resource.

The most recent investigation is a study entitled "Assessment of Hydrogeologic Conditions Within Alluvial and Stream Terrace Deposits in the Acton Area, Los Angeles County" prepared for the County, DPW in October 1990 by Richard C. Slade. Mr. Slade is a registered professional hydrologist who has conducted numerous consulting assignments in the upper Santa Clara River Valley, and he is highly regarded. A summary of his major findings relative to water availability and exploitation of the resource in the Acton Basin is provided below. Before summarizing his findings, however, it is useful to offer some comments on his approach.

In his report, Slade incorporates estimates concerned with (1) volume of groundwater in storage (the amount held in both the alluvial aquifer and stream terraces), (2) manmade groundwater recharge through holding basins and other structures designed to allow water to percolate into the ground, (3) natural recharge to the basin, and (4) surface and subsurface discharge (flows) from the Basin. Along with Slade's own estimates, he routinely offers comparable estimates by another consulting firm. A significant point in these comparisons is that Slade's estimates tend to be very conservative; for example, he estimates total water in storage for the Acton Basin (including both alluvial aquifer and stream terrace) ranges between about 15,000 acre-feet in drier periods to about 34,400 acre-feet in wetter periods (Slade 1990: Table 3). By comparison, the Brockmeier 1990 report (cited in Slade 1990) gave the volume of groundwater in storage as

108,000 acre-feet. Despite the cautious and conservative view, Slade concludes that additional groundwater development by the LACWD-37 is feasible and includes a provision for several new and additional wells. The clear inference (if unstated conclusion) is that the Acton Basin has neither been in nor is anticipated to be in an "overdraft" situation.

Table 3.1.2-3 presents Slade's major findings (excluding the Brockmeier report comparisons) regarding the water resource in the Acton Basin. In his evaluation, Slade did not actually determine the long-term weighted average annual rainfall based on isohyetal lines. Rather, he simply states that average annual rainfall is between 12 and 16 inches, and this implies an average annual water crop of from 55,600 to 73,948 acre-feet. The weighted long-term average annual rainfall actually amounts to 12.47 inches for the Acton Basin, which results in an annual water crop of 58,479 acre-feet. The 12.47 inches average annual rainfall yields an estimate of 2,339 to 7,017 acre-feet of recoverable water using a 4-percent to 12-percent recoverable factor.

Table 3.1.2-3

SUMMARY OF SLADE'S FINDINGS

Measured size of Acton Basin (acres)		55,500
Average annual rainfall (inches)		12.0
Water crop (acre-feet)		55,500
Alluvial aquifer surface exposure (acres)		1,587
Stream terrace deposit surface exposure (acres)		11,144
Groundwater in storage (acre-feet extractable):		
	Dry Period (represents all time low)	**Wet Period (above average, but not all time high)**
Alluvial aquifer	9,783	22,271
Stream terrace	5,100	12,124
Total	**14,883**	**34,395**
Annual groundwater recharge (acre-feet/year)		5,600 - 7,200
Subsurface outflow downstream from Basin (acre-feet/year):		
Dry period		1,200
Wet period		2,800
Surface outflow downstream from Basin		900

This estimate of recoverable water will be considered in relation to the current level of water extractions from the Acton Basin along with Slade's data on the size of the Acton groundwater resource and the water available for annual recharge.

Surface and subsurface flows in the Santa Clara River downstream of the Acton Basin are dependent on the extent of precipitation and water availability in the Acton Basin, as well as the precipitation in the downstream watershed. The western portion of the Acton Valley Subunit compares with the Acton Basin (to the east) as shown:

	Western Portion	**Acton Basin**
Area (acres)	44,134	56,275
Average annual water crop (acre-feet)	52,295	58,479
Weighted average annual rainfall (inches)	14.22	12.47
Recoverable water (acre-feet) at 4 percent	2,092	2,339
Recoverable water (acre-feet) at 12 percent	6,275	7,017
Potential storage in alluvial aquifer (acre-feet)	estimated 6,600	35,000

The major water purveyor in the Acton Basin is the LACWD-37. It has a 16-square-mile service area in the central part of the Basin. All other groundwater extractions handle only a small amount of water, as indicated in the tabulation below. "All other users" refers to pumping by individual domestic and irrigation users widely distributed throughout the basin.

Purveyor	**Approximate Current Annual Acre-Feet Extracted**
LACWD-37 (Average 1997-1999)	1,934
Acton Camp	115
Big Dipper Water Delivery (1997 CUP Approval)	240
Carson Bros.	75
Acton School	20
Subtotal	**2,384**
All Other Users (estimated 1,200 users at 1 acre-foot each)	1,200
Total	**3,584**

The foregoing estimate of the total current volume of water extracted from the Acton Basin groundwater resource (3,584 acre-feet) falls within the range of the total yield of recoverable water estimated for the long-term average annual rainfall year (2,339 to 7,017 acre-feet). If these estimates are near correct, it means that groundwater pumping in an average rainfall year routinely draws on recoverable water available in storage. Specifically, Slade estimates that the minimum amount of groundwater in storage during the drier period of time (several years running with a below- average precipitation) is just under 15,000 acre-feet. By comparison, during a period of above- average rainfall, he estimates the volume of groundwater in storage at over 34,000 acre-feet. Slade appears confident with his finding that the water resource potential is sufficient to make feasible development of additional high production wells by LACWD-37 in the Acton Basin alluvial aquifer. In addition, LACWD-37 has 2,200 acre-feet per year of supplemental water available from AVEK.

Slade reports that even during drier periods, rising water still occurs in the Santa Clara River in Soledad Canyon at the narrows near the downstream (western) limits of the Acton Basin. However, no quantitative estimates of this flow have been made. The major significance of this flow would appear to be the indication of a continuity of underflow out of Acton Basin even during drier periods. Slade makes the observation that discharge from the Basin whether by pumping or natural subsurface outflow is of a lesser magnitude than recharge (by stream runoff from higher ground and deep percolation). Thus, water levels in the groundwater reservoir tend to increase rapidly and quickly fill the Basin in periods of excess rainfall and runoff. By contrast, periods of deficient rainfall and reduced runoff tend to cause only a gradual reduction in basin-wide water levels (Slade 1990).

The total water use within the entire western portion of the Acton Valley Subunit has not been quantified, and there are no organized purveyors of water as there are in the Acton Basin. However, many individual domestic users throughout the Agua Dulce area maintain and operate their own wells as their source of supply. It is suggested that the total extraction of water within the western portion at the current time amounts to less than 1,000 acre-feet per year. As previously indicated, no water is currently imported into the western portion of the Acton Valley Subunit, although (as noted) some water is imported from the Antelope Valley into the Acton Basin. Accordingly, the only water resources available to users in the western portion of the Acton Valley Subunit during the dry season are (1) the recoverable water remaining from precipitation that falls on the area and (2) a limited volume of inflow of the Santa Clara River coming from the Acton Basin. During the wet season and periods of high river flow, the volume of surface and subsurface inflow from the Acton Basin will constitute a greater portion of total flow through the western portion of the Acton Valley Subunit. Nevertheless, a significant portion of Santa Clara River surface flow and underflow, measurable at the western boundary of the western portion of the Acton Valley Subunit during drier periods, actually derives from runoff resulting from precipitation falling within the western portion area.

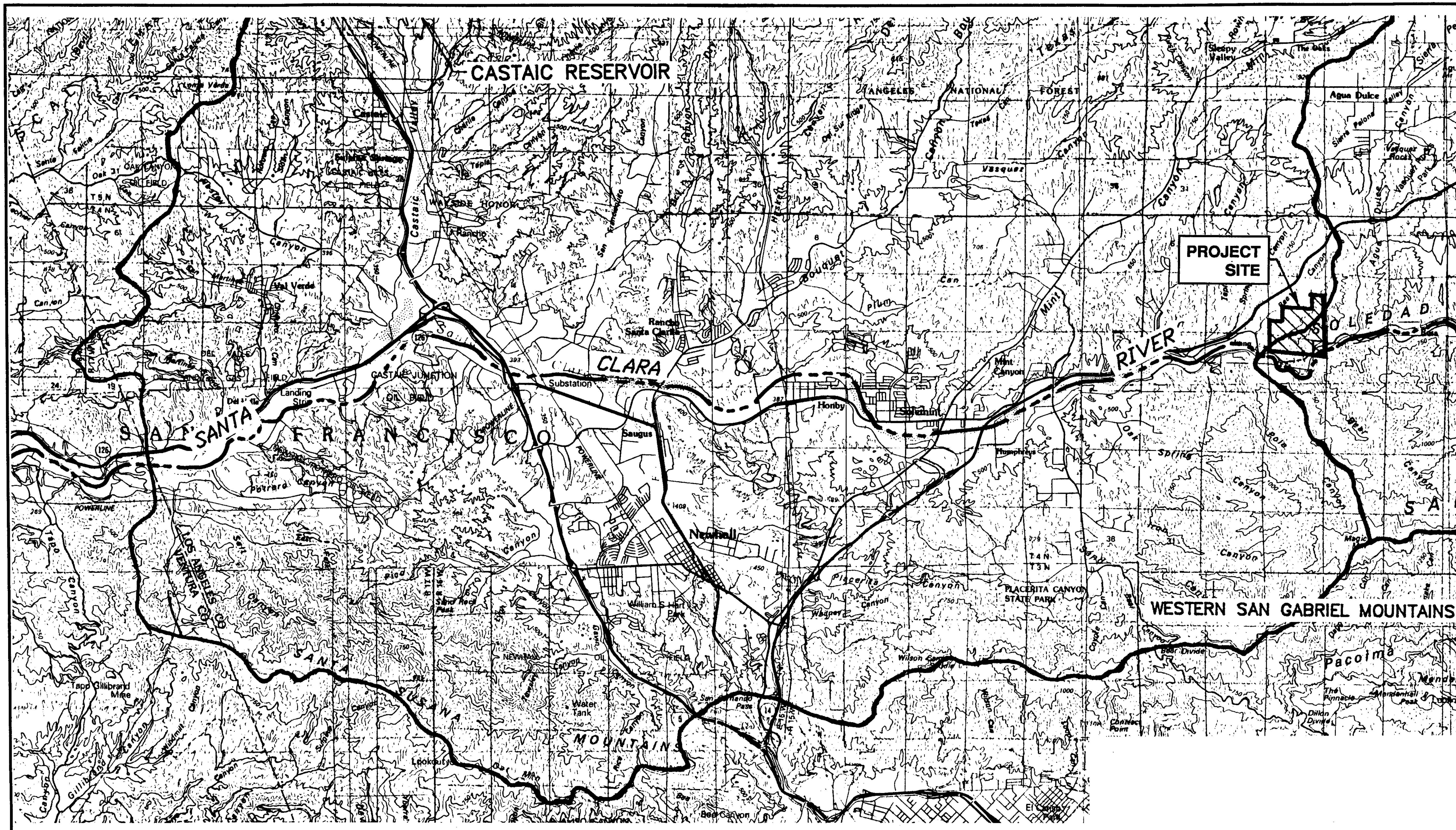
Eastern Subunit

The Eastern Subunit comprises a large area: it extends about 19 miles westward from New Lang Station to the Ventura County line. Along its western boundary, the area extends about 25 miles in a north-south direction; along its eastern boundary, the Eastern Subunit extends about 16 miles in a north-south direction. Much of the area north of Castaic and Castaic Lake is rural and only sparsely settled, and thus is generally similar to the Acton Valley Subunit. However, the southern portion of the Eastern Subunit is, by comparison, densely settled and must be characterized as a rapidly developing urban or suburban area. The southern portion of the Eastern Subunit is shown on Figure 3.1.2-4.

As indicated, the westward-flowing Santa Clara River is a central feature of the southern portion of the Eastern Subunit.

The topography of the southern portion of the Eastern Subunit is largely established by the near-level broad valley floor formed by the river. The many tributary streams flowing into the river from the north and south sides of the valley form an extensive area of ridge and canyon country. The central portion of the Santa Clarita Valley is the major focus of development within the entire Eastern Subunit. The City of Santa Clarita occupies about 42 square miles including the valley floor and lower reaches of the surrounding canyon country. As of 1994, the total population of the Eastern Subunit was on the order of 187,000. As a growth area, it is estimated that the total population of the area will reach 271,000 by the year 2010 (City of Santa Clarita website 2000).

In contrast to the limited development of water resources in the Acton Valley Subunit to the east, there has been a comparatively extensive development of water resource potentials in the



Source: USGS 1:100,000 series
Los Angeles, and Lancaster, CA

PROJECT SETTING
EASTERN SUBUNIT
Figure 3.1.2-4

southern portion of the Eastern Subunit. For example, in December 1986, Slade submitted a comprehensive report on the perennial yield and artificial (manmade) recharge potentials of the alluvial sediments in the Santa Clara River Valley to the Upper Santa Clara Water Committee (Slade 1986). This committee is comprised of the following members: LACWD-36 (Val Verde), Newhall County Water District (NCWD), Santa Clarita Water Company, and Valencia Water Company. The Castaic Lake Water Agency (CLWA) is an affiliate of the committee. The members of the committee are all water retailers, with water systems serving one or another part of the southern portion of the Eastern Subunit. The CLWA is essentially a water wholesaler, selling SWP water to the committee members, all of whom also pump and supply part of their water supply needs from their own wells.

In addition to the report on water resource potentials of the alluvial sediments of the Santa Clara River (Slade 1986), including some 13 tributary watersheds within the Eastern Subunit, Slade submitted a second report in February 1988 to the same five organizations that contracted for the alluvial sediments study. Each of these two comprehensive reports addresses the water resource potentials of one of the two main targets of groundwater pumping in the Eastern Subunit: the alluvial sediments and the Saugus Formation. The alluvial sediments of the Santa Clara River and tributaries currently represent the more significant resource, but the deeper underlying Saugus Formation is in fact a significant resource. Along with groundwater pumping of the recent river alluvium and the older Saugus Formation, the several water retailers all purchase some share of their total water supply requirement.

The production of water from the alluvium accounts for the major part of total production. For example, in 1985 total production from 67 wells (including for agricultural use only) amounted to 28,995 acre-feet, of which 24,103 acre-feet were from 59 shallow-depth alluvial wells (typically under 200 feet deep), and 4,892 acre-feet were from eight Saugus Formation wells (typical well depth of over 1,000 feet). Slade estimated that the total surface area of the alluvial aquifer was 16,410 acres and that groundwater in storage (fall 1985) totaled 176,409 acre-feet. He further estimated the maximum possible alluvial storage at 239,900 acre-feet. Finally, in 1985, Slade estimated the perennial yield of the alluvial aquifer at 31,600 to 32,600 acre-feet per year (Slade 1986).

While current dependence on the alluvial aquifer significantly outweighs dependence on pumping from the Saugus Formation, it should not be inferred that the water resource of the Saugus Formation is any less significant. The Saugus Formation is relatively underdeveloped thus far, but Slade estimates that the usable groundwater in storage amounts to 1.41 million acre-feet (compared with a maximum potential in storage in the alluvium of 240,000 acre-feet). The Saugus Formation is found beneath a surface area of approximately 39,000 acres (compared with a surface area of the alluvial aquifer of only 16,410 acres). The 1986 groundwater production from the Saugus Formation amounted to only 0.40 percent of the total volume of usable storage in the Saugus Formation (Slade 1988). Slade acknowledges that much work is yet to be done in order to develop a comprehensive and firm estimate of the safe yield or perennial yield of the Saugus Formation as a major water resource. However, the safe yield of the Saugus Formation is currently placed at a very nominal 22,000 acre-feet per year (NCWD 1993). This is a very notable increase in total perennial yield of the local resources represented by the alluvial aquifer alone.

As noted, the various retail purveyors are taking a portion of their current water supply from the CLWA. The CLWA has been entitled to sell up to 54,200 acre-feet per year. In 1999, the CLWA purchased entitlements to an additional 41,000 acre-feet per year from the SWP. The following is an estimate of the amount of water each purveyor was distributing (1991 or 1992) and the approximate amount of water obtained from the CLWA.

Purveyor	Total Distributed (acre-feet)	Amount From CLWA (acre-feet)
NCWD	2,200	1,100
Santa Clarita Water Company	19,000	9,500
Valencia Water Company	17,000	8,500
LACWD-36	650	650

In February 2000, the Upper Santa Clara Valley Water Committee (Committee) issued the Santa Clarita Valley Water Report for 1999 (SCVW Report). This is an annual report the Committee began issuing in 1999 which provides information regarding water resources within the Santa Clarita Valley.

The following table summarizes water production for each purveyor in 1999, based on information provided in the SCVW Report.

Purveyor	1999 Total Distributed (acre-feet)	1999 Amount From CLWA (acre-feet)
NCWD	9,348	5,050
Santa Clarita Water Company	24,513	10,772
Valencia Water Company	22,735	10,806
LACWD-36	654	654

The report summarizes current and projected water demand for the study area, as of the end of 1999, as follows:

- In 1999, the total water demand reported by the four retail purveyors is 57,250 acre-feet.
- Los Angeles County Regional Planning Department maintains water demand projections for all pending, approved and recorded projects for which land divisions have been filed within the study area of this report. Known as the Development Monitoring System, it reports that the projected water demand from all projects being tracked is 22,600 acre-feet per year.
- Total existing plus projected water demand as measured under the DMS system is 79,850 acre-feet per year.
- Agricultural and miscellaneous water demands are estimated to be 7,100 acre-feet per year.

Project Site Vicinity

The TMC project site is located on the north side of the Santa Clara River in the Acton Valley Subunit (as shown on Figures 3.1.2-2 and 3.1.2-4). The actual project site includes the northeast quarter of the northeast quarter of Section 16 and much of Section 9, directly north of Section 16 (see Figure 1.2-2). Figure 3.1.2-5 is a larger scale geologic map showing the Santa Clara River (immediately south of the Project site). The only source of water available to the Project is the alluvial aquifer formed by the deeply entrenched river channel in lower Soledad Canyon.

As part of its planning for this Project, TMC has conducted detailed investigations of the availability, adequacy, and reliability of the water resource offered by the Santa Clara River. These investigations have included seismic studies designed to delineate and establish the depth, size, and character of the alluvial aquifer formed by the subsurface channel of the river in the site vicinity. Five test wells were also drilled to establish critical factors affecting well design and safe yield determinations for the aquifer. The seismic studies used in conjunction with results of ongoing well monitoring to establish seasonal trends in subsurface water levels have facilitated determination of the volume of water stored in various parts of the aquifer, the volume of sustained subsurface flow across the property (during the drier periods), and the level and rate of replenishment of the aquifer occurring during the rainy season.

Annual precipitation and runoff, particularly from the higher mountainous terrain of the western portion of the Acton Valley Subunit, are the primary sources of water, maintaining both surface and subsurface flow in the Santa Clara River. TMC's investigation of water resource availability has also focused on levels of variation in annual precipitation and its direct measurable impact on the level of flow of the river. The various elements of the investigation of water resources,

including 3½ years of monitoring subsurface water levels in the test wells, are set forth in detail in the report prepared by GWSI (1993), which was prepared as a reference for this EIS.

While the Santa Clara River is technically classified as an intermittent stream (meaning that at least some sections of the river normally run dry for a few months during the dry season), it has normally maintained a significant measurable year-round surface flow in the Project vicinity near the western boundary of the Acton Valley Subunit (just upstream of Lang). During the 20-year period (1949-50 through 1969-70) during which a surface water gaging station was operating at the railroad bridge immediately west of the first railroad tunnel east of Lang (see Figure 3.1.2-5), no month reported a surface flow of less than 19 acre-feet. The location of this gaging station is shown on Figure 3.1.2-5 as the "Old Lang Gaging Station." Table 3.1.2-4 shows month-by-month surface water flows in the Santa Clara River as recorded at the Old Lang Gaging Station from 1949-50 through 1969-70.

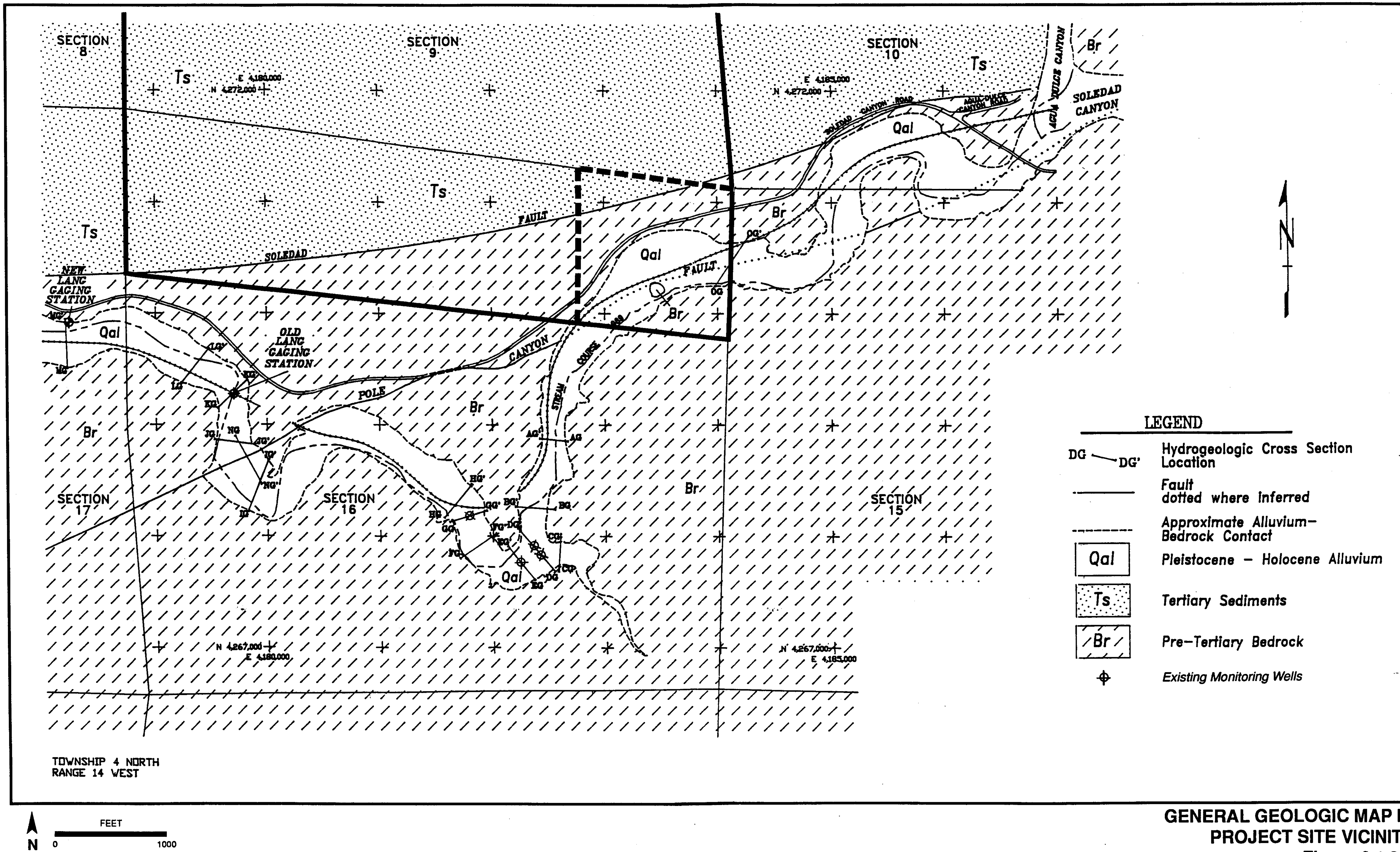
Critical review of the surface flow data in the table reveals (1) the lowest average monthly surface flow occurs in September; (2) the average monthly flow in September was 66 acre-feet, which is more than three times the lowest recorded monthly flow (19 acre-feet); and (3) the low of 19 acre-feet occurred only twice during the period of record. Of even greater significance is the fact that the surface flow data indicate a continuously high level of subsurface flow

Table 3.1.2-4

SURFACE WATER FLOWS (ACRE-FEET) IN SANTA CLARA RIVER AT OLD LANG GAGING STATION NEAR LANG, CALIFORNIA 1949-50 through 1969-70

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
OLD LANG STATION F93-R													
1949-50	61	53	63	83	192	184	126	105	83	50	54	56	1,110
1950-51	53	43	42	49	40	66	91	98	84	79	72	57	774
1951-52	71	47	53	9,630	632	7,090	2,110	895	326	153	138	86	21,231
1952-53	97	178	313	300	282	271	237	165	134	102	86	85	2,250
1953-54	83	74	68	145	278	404	356	181	108	110	99	91	1,997
1954-55	90	80	75	103	156	157	128	153	99	78	76	74	1,269
1955-56	68	66	62	69	87	130	136	139	98	86	80	77	1,098
1956-57	76	67	69	67	55	78	90	93	80	78	78	76	907
1957-58	79	66	71	66	328	743	4,550	825	283	130	108	95	7,344
1958-59	145	146	116	246	351	189	127	111	92	84	86	83	1,776
1959-60	69	68	68	68	67	70	69	70	68	65	65	60	807
1960-61	58	316	164	124	91	38	38	36	32	28	33	22	980
1961-62	19	19	119	139	1,900	791	449	328	169	97	82	80	4,192
1962-63	84	83	82	85	142	145	131	104	86	79	74	65	1,160
1963-64	65	62	58	69	50	51	62	66	54	53	53	54	697
1964-65	45	43	40	30	23	25	46	43	36	31	34	36	432
1965-66	35	1,300	3,300	1,770	1,010	778	449	308	115	68	54	45	9,232
1966-67	63	91	523	757	499	1,030	2,290	1,880	729	212	104	89	8,257
1967-68	73	255	487	300	242	276	180	72	32	32	30	25	2,004
1968-69	No rec	No rec	No rec	No rec	No rec	No rec	No rec	No rec	No rec	No rec	No rec	No rec	Inc.
1969-70	282	348	354	410	506	1,170	New Lang Station						Inc.
Σ	1,616	3,405	6,127	14,510	6,931	13,686	11,665	5,672	2,708	1,615	1,406	1,256	67,517
Average	**81**	**170**	**306**	**726**	**347**	**684**	**614**	**299**	**143**	**85**	**74**	**66**	**3,554**
N	20	20	20	20	20	20	19	19	19	19	19	19	19

Source: GWSI (1993) No rec = No Record Inc. = Inconclusive



Source: Ground Water Systems, Inc.

GENERAL GEOLOGIC MAP IN PROJECT SITE VICINITY
Figure 3.1.2-5

throughout the entire period of record. Surface flow can be taken as a prime indicator that the subsurface aquifer is fully saturated and flowing at a rate dependent on stream gradient.

The Old Lang Gaging Station is located at the point of a major constriction in the subterranean channel of the Santa Clara River. The gaging station was relocated about 1,800 feet downstream (see Figure 3.1.2-5) in March 1970. Unfortunately, the "New Lang Gaging Station" was located at a point where the subterranean channel has a much larger cross-sectional area than at the constriction point of the Old Lang Gaging Station. Based on the seismic studies undertaken for the GWSI report (1993), the subterranean channel cross section at the New Lang Gaging Station was determined to be more than 19,000 square feet; by comparison, the subterranean channel cross section at the Old Lang Gaging Station was found to be only 7,200 square feet. As a consequence, gaging station surface flow for the two stations cannot be compared. The subterranean channel at the new gaging station can carry a subsurface flow of approximately 20 acre-feet per month, even while showing no surface flow. Moreover, and at the same time, surface flow may be evident at the location of the Old Lang Gaging Station because subsurface flow capacity is comparatively limited. At the constriction point, maximum subsurface flow is about 14 acre-feet per month.

It is significant that the 1949-50 through 1969-70 streamflow record at the site of the Old Lang Gaging Station shows a continuing year-round flow. The strength of this record indicates that in the future, even if there are occasional months when no surface flow is evident, such periods of no surface flow would be infrequent and of short duration. Moreover, for purposes of monitoring and forecasting streamflow and water availability in the lower Soledad Canyon area, it has been found that cumulative monthly rainfall during the rainy period can be used to forecast annual surface flow of the river at the site of the Old Lang Gaging Station.

Figure 3.1.2-6 provides a plot correlating annual precipitation at Station 250 (Acton Camp) with annual surface flow over the period of record at the Old Lang Gaging Station. For example, in April (based on rainfall to date), a forecast might be made indicating the total surface flow anticipated for the water year ending in September, using the estimating relationship shown on Figure 3.1.2-6. This annual forecast can then in turn be examined in the light of the long-term record of average monthly distribution of annual surface flow to obtain a quantitative appreciation of the likelihood of a given level of surface flow during each of the drier months of the water year. Table 3.1.2-5 provides details showing the percentage of monthly distribution of annual surface flows, along with an indication of the range over which the level of surface flow has varied for the 20-year period of record.

Water levels in the test wells completed by TMC and C.A. Rasmussen Company have been monitored on a regular monthly basis since late 1989. The monitoring period includes drier years as well as a near-average year and three above-average very wet years (GWSI 1993; DPW - Hydraulics and Water Conservation).

Precipitation data can be reviewed with the trend in water level data found in one of the test wells monitored over this same period of time.

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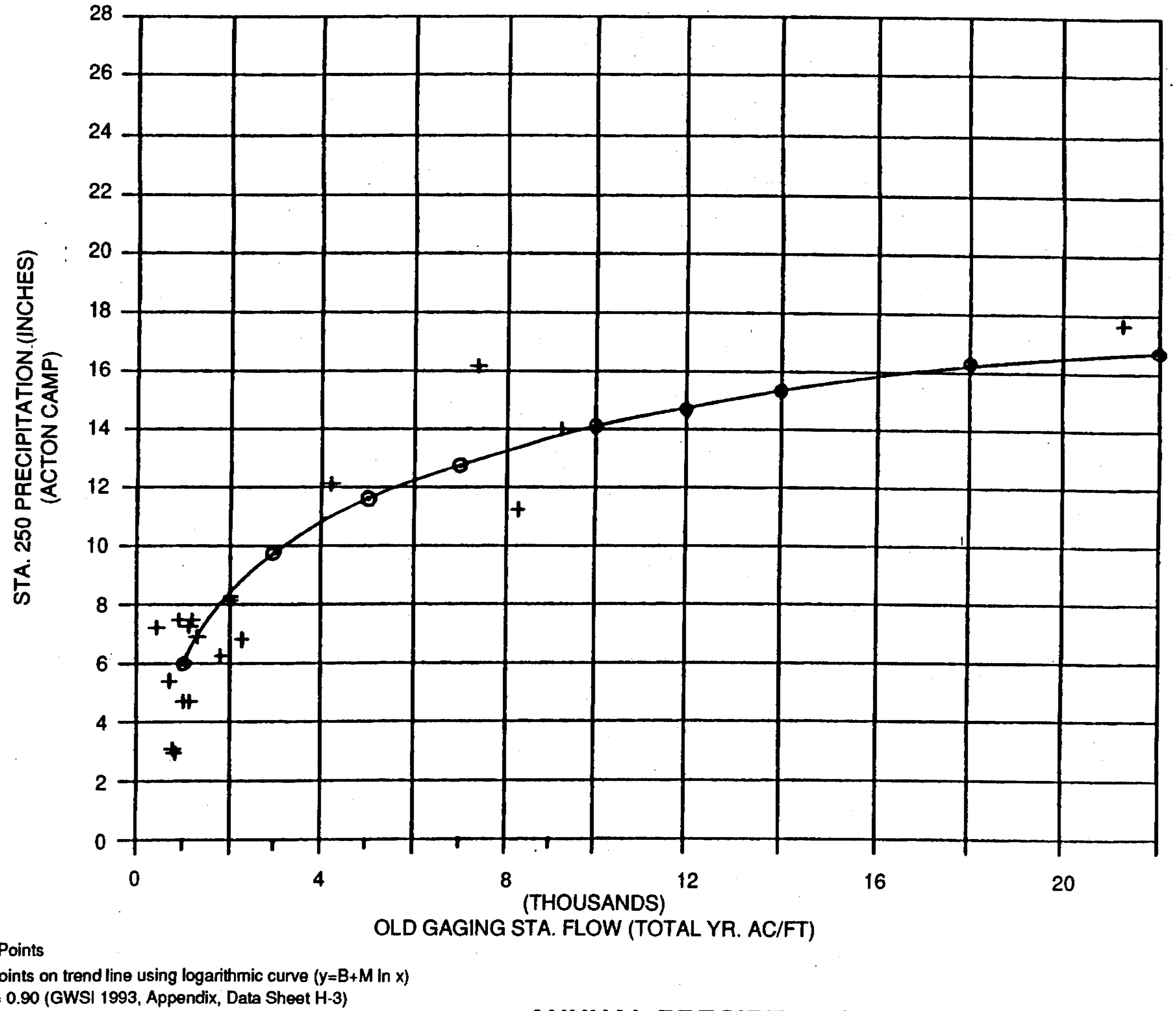


ANNUAL PRECIPITATION VS. ANNUAL SURFACE FLOW
STA. 250 (1949-50 THRU 1967-68)
Figure 3.1.2-6

Table 3.1.2-5

MONTHLY DISTRIBUTION OF TOTAL AVERAGE ANNUAL
SURFACE FLOW OLD LANG GAGING STATION 1949-50 THROUGH 1969-70

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Average Monthly Flow (acre-feet)	81	170	306	726	347	684	614	299	143	85	74	66	3,595
Average Monthly Flow (percent of total year)	2	5	9	20	10	19	17	8	4	2	2	2	----
Highest Monthly Flow (acre-feet)	282	1,300	3,300	9,630	1,900	7,090	4,550	1,880	729	212	138	95	31,016
Lowest Monthly Flow (acre-feet)	19	19	40	66	23	25	38	36	32	28	30	22	378

Monthly water level monitoring data for test Well MW-1 are shown in Table 3.1.2-6 for the period from November 1989 through July 1993. This well, drilled in August 1989, was completed at an overall depth of 91 feet. Depth of water in the well on August 13, 1989, stood at 1,806 feet above sea level. This was in the midst of the dry season of water year 1988-89, which was a year of seriously deficient rainfall. After completion of the well and with a continuation of extremely dry conditions (1989-1990), the water level fell to 1,798 feet by January 1990. Thereafter, the water level rose following very modest winter rains to 1,814 feet above sea level (April 1990). Table 3.1.2-7 shows the high and low range of water levels in this well over the period of record.

The well monitoring data also show the relatively short period of time occurring between the low and high levels (marking the period of full recharge of the aquifer). Figure 3.1.2-7 provides a graphical representation of the trend in water level in test well (MW-1) during this period of significant variation in seasonal rainfall. An important observation to be made is that the annual trend in high and low levels of water remains remarkably stable compared with the variation in annual precipitation. The alluvial aquifer is composed of coarse sand and gravel and recharges rapidly when the level of precipitation is sufficient to provide for percolation regardless of water use.

In addition to the continuous and rapid rate of recharge of the alluvial aquifer, the amount of water actually stored in the aquifer in the immediate area of the Project site is important. Subsurface water storage in the river alluvium in the Project vicinity was estimated for various reaches of the river by GWSI (1993). The total storage in the river alluvium extending from the eastern boundary of the property westward to the boundary of the Acton Valley Subunit (just east of Lang [see Figure 3.1.2-5]) was estimated at 757 acre-feet. Approximately 123 acre-feet of the total amount are stored downstream of the constriction point at the site of the Old Lang Gaging Station. The downstream aquifer has historically been fully charged, as evidenced by the continuous surface flows at the Old Lang Gaging Station. However, the flow at the Old Lang Gaging Station did cease during the recent drought (R. Watson, personal communication 1993). The downstream aquifer storage could be a significant factor contributing to the maintenance of a continuing surface flow at points further downstream of the Old Lang Gaging Station.

3.1.2.2 Environmental Effects

The discussion that follows includes identification of impact significance criteria and the environmental effects associated with TMC's anticipated use of water. TMC's projected use of water is described, quantifying prospective water demands for differing types of use. Water use is compared to available resources, considering the average annual variability and seasonal variability. Potential impacts of water use relative to water availability will be identified along with appropriate mitigation measures.

Table 3.1.2-6

TEST WELL MW-1
WATER LEVEL MEASUREMENTS
TRANSIT MIXED CONCRETE/C.A. RASMUSSEN
SOLEDAD CANYON SITE

Date Measured	Water Surface Elevation Above Mean Sea Level [1] (feet)	Date Measured	Water Surface Elevation Above Mean Sea Level [1] (feet)
11/16/89	1,798.11	10/31/91	1,804.19
01/15/90	1,797.58	11/22/91	1,803.12
03/12/90	1,810.46	12/19/91	1,801.56
04/17/90	1,813.74	01/24/92	1,815.46
05/17/90	1,808.77	02/26/92	1,820.26
06/14/90	1,807.22	03/27/92	1,820.17
07/18/90	1,808.70	05/01/92	1,817.46
08/17/90	1,803.58	06/03/92	1,817.37
09/14/90	1,801.96	06/26/92	1,817.14
10/15/90	1,799.39	07/28/92	1,816.23
11/13/90	1,797.03	08/24/92	1,811.81
12/11/90	1,795.20	09/24/92	1,807.72
01/14/91	1,794.34	10/30/92	1,806.66
02/18/91	1,793.98	11/30/92	1,806.59
03/14/91	1,799.91	12/30/92	1,815.58
03/29/91	1,819.07	01/29/93	1,820.54
04/02/91	1,818.89	02/00/93[2]	----- --
05/09/91	1,817.01	03/19/93	1,818.93
06/17/91	1,813.83	04/27/93	1,819.28
07/23/91	1,810.50	05/26/93	1,818.64
08/21/91	1,807.77	06/22/93	1,818.19
09/23/91	1,805.97	07/27/93	1,817.60

[1] ▸ **Water surface elevations in test wells are measured monthly by Law/Crandall, Inc.**
▸ **Water elevations have been reported in the Santa Clara River Underflow Monitoring 1991 Annual Report, July 30, 1992, Law/Crandall, Inc.**

[2] ▸ **No measurement was taken in February 1993 due to flood conditions.**

Table 3.1.2-7

HIGH AND LOW WELL WATER LEVELS COMPARED TO ANNUAL RAINFALL

Water Year	Monitoring Date	Low Water Level (feet)	High Water Level (feet)	Station 405B Annual Rainfall (inches) [1]
1989-1990	16 Nov 89 17 Apr 90	1,798	1,814	6.90
1990-1991	18 Feb 91 29 Mar 91	1,794	1,819	14.77
1991-1992	19 Dec 91 26 Feb 92	1,802	1,820	23.76
1992-1993	30 Nov 92 29 Jan 93	1,807	1,821	33.18
1994-1995	27 Oct 94 27 Jan 95	1,805	1,820	21.72

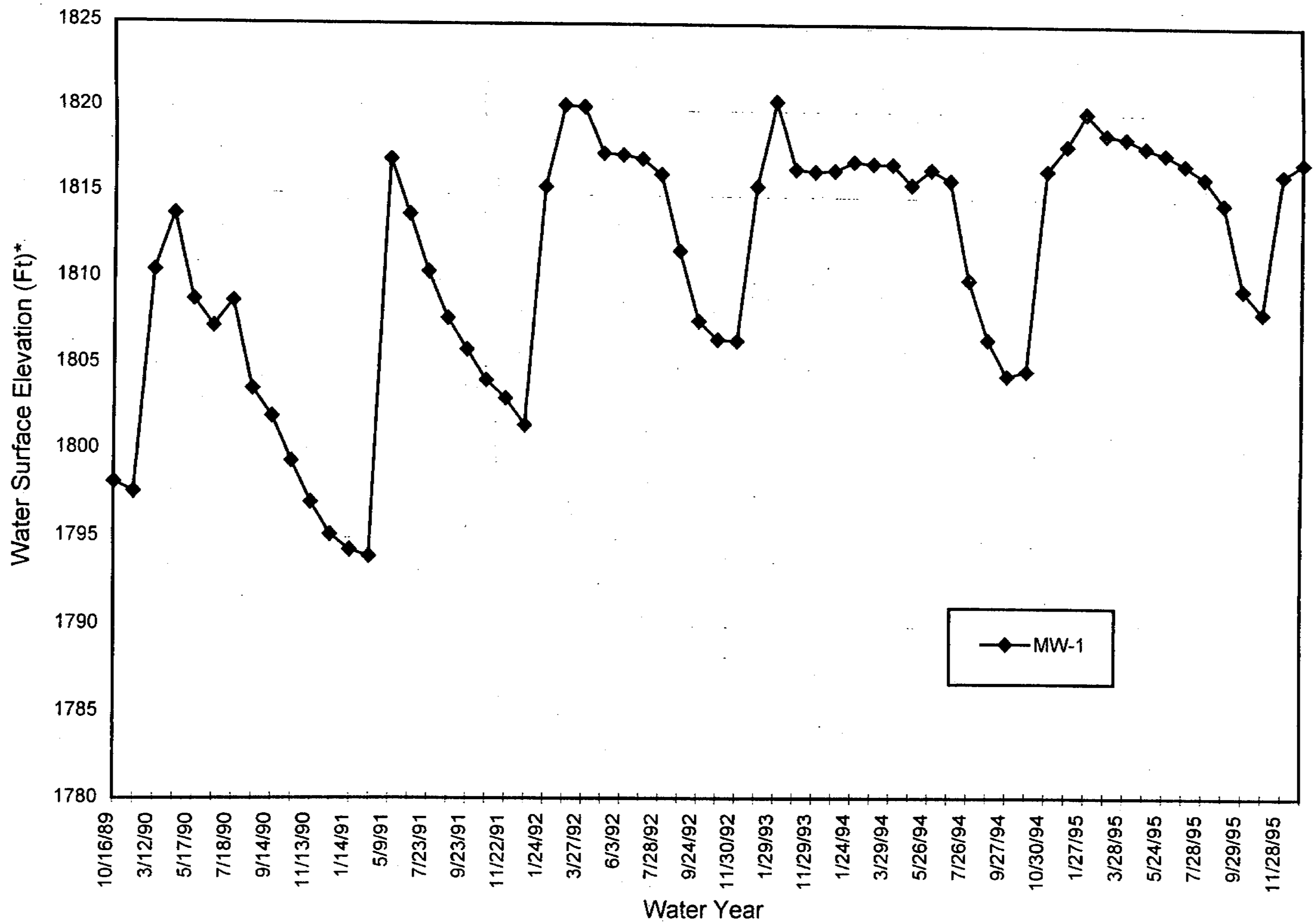
(1) **Average annual rainfall at this station is 14.33 inches per year for the 47 years of records between 1949 and 1996.**

Significance Criteria

Potential water use impacts will be considered significant if:

- use of water by the Project substantially affects water resource availability for municipal, agricultural, industrial, private, or recreational uses;
- use of water by the Project reduces or depletes water resources in such a manner that sensitive ecological habitats cannot be maintained;
- groundwater recharge saturates loosely consolidated sediments making them susceptible to liquefaction in the event of an earthquake; and/or
- groundwater withdrawal results in soil settlement.

In considering the differing types of adverse effects that might be attributable to TMC's projected water use, local impacts potentially occurring in the immediate project vicinity are differentiated from impacts potentially occurring in the broader region as a result of TMC's water use.



* Water surface elevation in test well
is measured monthly by Law/Crandell.

WATER LEVELS AT WELL MW-1
Figure 3.1.2-7

TMC's Projected Demand for Water

Projected use of water by the Project has been estimated by TMC separately for its Phase 1 and 2 levels of operations. Each phase is expected to last 10 years, as described in the Project description. Tables 3.1.2-8 and 3.1.2-9 provide the detailed estimates for Phases 1 and 2, respectively. Each table provides an estimate of total monthly water use for summer (May through October) and winter (November through April) months as described below.

	Acre-Feet Per Month
Phase 1	
Summer Rate	38.43
Winter Rate	35.20
Phase 2	
Summer Rate	64.59
Winter Rate	59.72

These estimates of water demand reflect the planned use of state-of-the-art, low-water demand aggregate processing equipment. Specifically, TMC proposes to use process water clarifiers, which will allow for recycling washwaters. All water taken for Project purposes will be used and recycled. No waste or return of water to the river is planned. The planned use of water is 100-percent consumptive by design.

These demand estimates are based on detailed calculations that are explained in Appendix C of this EIS. Further reductions in water demand may be possible if water economy technology advances during the lifetime of the Project. Moreover, additional water savings might be achieved if water draining from aggregate product stockpiles can be captured for reuse. These additional water saving potentials have been estimated in Appendix C.

The projected use of water is estimated to average 442 acre-feet per year for the first 10 years of the Project life. During the second 10 years of the 20-year project, total water use is projected to average 746 acre-feet per year.

Projected Water Use in Relation to Resource Availability

TMC plans to obtain its Project water by means of a series of well pumps that will pump water out of subsurface water storage in the alluvial aquifer. There will be no surface water impoundment or dam. Based on the historic volume of water in storage in the aquifer, it is anticipated that even with the Project there will almost always be some level of surface and subsurface flow in the river downstream of the constriction point at the site of the Old Lang Gaging Station.

Table 3.1.2-8
TMC PROJECT WATER DEMAND ESTIMATIONS
PHASE 1 (FIRST 10 YEARS OF OPERATION)

	Use (acre-feet/month)	
	Summer Rate	**Winter Rate**
Rock and Sand Plant		
Washwater Loss to Product Stockpiles	14.26	14.26
Use for In-Plant Dust Suppression	3.10	3.10
Concrete Batch Plant		
Use in Concrete Production	1.67	1.67
Concrete Truck Washout and Cleanup	0.67	0.67
Ancillary Facilities and Other Uses		
Aggregate Truck Washdown	0.48	0.24
Loss to Disposed Washed Fines	5.28	5.28
Compaction of Pit Screened Fines	3.96	2.63
Dust Suppression in Operations Yard and Roads	8.56	6.90
Office and Maintenance Facilities Use	0.45	0.45
Total Project Use	**38.43**	**35.20**

Table 3.1.2-9
TMC PROJECT WATER DEMAND ESTIMATIONS
PHASE 2 (FOLLOWING 10 YEARS OF OPERATION)

	Use (acre-feet/month)	
	Summer Rate	**Winter Rate**
Rock and Sand Plant		
Washwater Loss to Product Stockpiles	27.86	27.86
Use for In-Plant Dust Suppression	5.16	5.16
Concrete Batch Plant		
Use in Concrete Production	1.90	1.90
Concrete Truck Washout and Cleanup	0.77	0.77
Ancillary Facilities and Other Uses		
Aggregate Truck Washdown	1.02	0.51
Loss to Disposed Washed Fines	10.32	10.32
Compaction of Pit Screened Fines	7.73	5.15
Dust Suppression in Operations Yard and Roads	9.20	7.42
Office and Maintenance Facilities Use	0.63	0.63
Total Project Use	**64.59**	**59.72**

With regard to surface flow, the amount of water to be taken out of the aquifer by the Project, which would be considered significant, is the amount that would result in insufficient flow to maintain the downstream unarmored threespine stickleback habitat. The quantitative amount would differ depending on cumulative annual rainfall, the level of storage in the aquifer, and the season of the year.

During normal rainfall years, there would be sufficient water available for the TMC Project's planned extractions. It is only during periods of prolonged drought characterized by several consecutive years of below-normal rainfall that Project extractions could have a potentially significant impact on downstream surface flows. The quantitative extraction amount that will significantly impact downstream surface flows will vary depending on weather patterns. Accordingly, the habitat monitoring and protection program, discussed in Section 3.1.2.3, was developed to mitigate this potential impact (see Mitigation Measure WR1).

The total volume of water stored in the Santa Clara River alluvial aquifer in the Project vicinity is estimated at 757 acre-feet, of which approximately 123 acre-feet are stored in that portion of the aquifer downstream of the constriction point at the location of the Old Lang Gaging Station. One notable characteristic of the alluvial aquifer from which TMC plans to obtain its supply of water for the Project is that the aquifer storage is recharged very rapidly when the rainy season commences. Moreover, the aquifer tends to become quickly and fully recharged (fully saturated) with only moderate levels of rain (regardless of whether it is an average or subaverage rainfall year). In the rainy season, aquifer recharge is primarily dependent on infiltration of rainfall into the aquifer. However, some level of aquifer recharge is continuous as a result of underflow from upstream areas. The underflow is at its maximum during the wet season, but it is continuous throughout the year, at some level, as the monitoring data from the test wells clearly indicate.

Aquifer Storage and Effects of Pumping During Wet Season

Measured water levels in the permeable alluvial aquifer at the end of the dry season indicate that the aquifer is often not fully saturated at that time. However, with the onset of winter rains and surface runoff, the aquifer recharges rapidly because of the high porosity of the river alluvium (GWSI 1993). Throughout the wet season, while surface flow continues in the river, the saturation of the aquifer is maintained by sustained underflow from the flanks of the river. Often, the surface flow of the river at the Project site continues through the wet season and for an additional 2 to 3 months into the dry season. Thereafter, surface flow ceases upstream of the Pole Canyon Fault (as shown on Figure 3.1.2-5). Underflow continues during the dry season, even though the level of flow decreases somewhat. The continued underflow contributes to some level of aquifer recharge even during the dry season. Accordingly, during the wet season and for some months following the wet season, the alluvial aquifer is found to be either totally saturated or at least in a highly saturated condition (GWSI 1993).

To assist in visualizing the effect of TMC's use of water on water availability in the alluvial aquifer, note the relationships set forth in the following equation:

Available Water	=	Water in Storage	-	TMC Water Use	+	Aquifer Recharge	-	Downstream Surface and Subsurface Flow

Aquifer recharge is from two sources: direct infiltration of rainfall, and migration of subsurface flow. Also, as noted, there should always be some level of surface and subsurface flow continuing downstream from the constriction point.

During the wet season, it is anticipated that TMC's use of water will be wholly replaced by inflow to the aquifer (composed of a combination of subsurface underflow from upstream and infiltration of rainwater). The downstream flow will normally continue with a reduction in surface flows from 35 to 65 acre-feet per month (depending on project phase), and there should be no significant reduction of available water in storage in the alluvial aquifer during the wet season.

Surface water flows were measured near the Project vicinity at the Old Lang Gaging Station between water years 1949-50 and 1969-70. Surface flows at this gaging station ranged between 432 and 21,231 acre-feet per year; the second highest recorded annual surface flow is 9,232 acre-feet. All months had surface flow recorded (GWSI 1993). On the chart on the next page, average monthly surface flows (in acre-feet) at this station are compared to projected TMC monthly usage during the wet season and the following period, during which surface flow normally continues.

The above assumes no net drawdown of water stored in the aquifer. Thus, during the wet season, and for the first 3 months during the dry season, on average, downstream surface flows will continue (even assuming no decline in storage). The data indicate that surface flow would be reduced approximately 9 percent during Phase 1 operations and approximately 16 percent during Phase 2 operations at the Old Lang Gaging Station. However, the effects of these reductions on the maintenance of instream habitats is not known, and appropriate monitoring and mitigation are proposed (see Mitigation Measure WR1).

Period	**Month**	**Average Measured Flow (acre-feet)**	**TMC Water Use (acre-feet)**		**Downstream Surface Flow After Pumping (acre-feet)**	
			Phase 1	**Phase 2**	**Phase 1**	**Phase 2**
Rainy Season	November	170	-35	-60	135	110
	December	306	-35	-60	271	246
	January	726	-35	-60	691	666
	February	347	-35	-60	312	287
	March	684	-35	-60	649	624
	April	614	-35	-60	579	554
Dry Season (surface flow continues)	May	299	-35	-60	264	239
	June	143	-35	-60	108	83
	July	85	-35	-65	50	20
Average		**375**			**340**	**314**

Aquifer Storage and Effects of Pumping During Dry Season

It is assumed that surface flows would continue but diminish during June and July. During the late summer and fall months, surface flows upstream from the Pole Canyon Fault would stop. Surface flow at the Old Lang Gaging Station would normally continue at the average amounts listed below. These amounts (in acre-feet) are compared below to the projected TMC use in the dry season.

Period	Month	Average Measured Flow (acre-feet)	TMC Water Use (acre-feet)		Downstream Surface Flow After Pumping (acre-feet)	
			Phase 1	Phase 2	Phase 1	Phase 2
Dry Season (no surface flow upstream of Pole Canyon Fault)	August September October	74 66 81	-38 -38 -38	-65 -65 -65	36 28 43	9 1 16

During the dry season of any average rainfall year, pumping would draw down the aquifer. However, the aquifer quickly recharges with annual rainfall; thus, the amount of drawdown is temporary and therefore not significant. If it is assumed that TMC's entire use during August, September, and October is taken from aquifer drawdown, then surface flow downstream should remain unchanged due to TMC's use. As shown below, the amount of aquifer drawdown is not significant.

	Drawdown of Aquifer (acre-feet)	
	Phase 1	Phase 2
August	38	65
September	38	65
October	38	65
Total	**114**	**195**

These estimates of aquifer drawdown should be compared with the total acre-feet of water in storage (634 acre-feet at full saturation) in the aquifer upstream of the constriction point at the site of the Old Lang Gaging Station. Dry season drawdown of the aquifer is thus not significant, considering the fact that total aquifer replenishment or recharge will normally commence in November.

As previously shown, alluvial storage is influenced by inflow recharge, pumping, and outflow. Total dry season drawdown of water in storage between the eastern project boundary and the Old Lang Gaging Station can be summarized in acre-feet as follows, assuming inflow and outflow remain constant:

Phase	Water in Storage at End of Wet Season (acre-feet)	TMC Water Use June through October (acre-feet)	+	Inflow Constant (average)	-	Outflow Constant (average)	=	Resultant Storage in Alluvium (acre-feet)
1	634	190	+	normal	-	normal	=	444
2	634	325	+	normal	-	normal	=	309

Because TMC water use during the dry portion of an average rainfall year will not exceed the storage capacity of the aquifer, sufficient subsurface storage is available to maintain downstream surface flows.

Continued pumping of the aquifer without anticipated aquifer recharge could seriously reduce essential levels of flow during unusually dry periods and thereby create serious adverse environmental impacts. Month-to-month and yearly variation in precipitation with resultant variation in surface flows as shown in GWSI (1993) report and in Table 3.1.2-4 of this section leaves open the possibility that constant pumping could cause significant adverse impacts on sensitive riparian habitats. However, such impacts would not be allowed to occur because TMC will implement a habitat monitoring program and has made a commitment to reduce or stop pumping in order to maintain habitat quality (see Mitigation Measure WR1).

Impacts on Resource Availability

Local Impacts

When considering the impact significance criteria established previously and the fact that the subsurface storage of available water is not affected, no significant impact is expected on any local water user or sensitive wildlife habitat during average or wet conditions.

However, it is recognized that surface flows are related to saturation of the alluvial aquifer and that pumping of the aquifer (river underflow) may result in a delay of the recovery of surface flow after the dry season and/or an earlier decline of surface flow after the wet season. Pumping could, therefore, result in significant impacts on sensitive habitats unless anticipated by monitoring and mitigation (see Mitigation Measure WR1).

Regional Impacts

Relative to regional impacts, it is evident that TMC's projected water use should be considered nonsignificant and that it does not constitute a significant adverse regional impact. Furthermore, in considering TMC's application to appropriate water, the SWRCB will fully consider the potential for any regional impacts.

The Project site is downstream and remote from prospective concentrations of water users in the Acton and Agua Dulce regions, and no significant adverse impacts can affect those regions.

Because the Project's use of water is relatively small in comparison to the total water resources available to downstream users in the Eastern Subunit, no significant impact on water users in the Eastern region is expected.

Source of Water Resources Used in the Eastern Basin	Project Size of Water Resource (acre-feet)
Alluvial Aquifer	31,600 to 32,600 annual safe yield
Saugus Formation	11,000 to 22,000 annual safe yield (preliminary conservative estimate)
Castaic Lake Water Agency	54,200 annual contract availability to Eastern Subunit
Castaic Lake Water Agency	41,000 annual contract amount purchased from the Wheeler Ridge-Maricopa Water District in 1999
Combined	137,800 to 149,800 annual safe yield and contract amounts

TMC's total annual requirement (Phase 1: 442 acre-feet and Phase 2: 746 acre-feet) is not significant relative to the above estimates of water resource availability in the Eastern Subunit and thus is not considered a significant impact.

In addition, the SCVW Report for 1999 presents the following summary regarding the Santa Clarita Valley's water resources, for planning purposes:

- Current water supply ranges from 156,900 to 142,800 acre-feet per year.
- Existing retail water demand is 57,250 acre-feet.
- Projected water demand estimated by Los Angeles County Development Monitoring System is 22,660 acre-feet per year.
- Projected water demand from agricultural and miscellaneous uses is 7,100 acre-feet per year.
- Projected water demand over the next ten or so years is estimated to be 87,000 acre-feet.
- The Santa Clarita Valley currently has a surplus of supply that ranges from 69,900 to 55,800 acre-feet during varying water supply conditions over existing and near term projected water demand.

Geologic Impacts

No geologic impacts, such as ground swelling, due to groundwater recharge are anticipated because recharge will occur by natural processes. Water will not be injected into the aquifer or dammed for spreading. Liquefaction is not anticipated because the aquifer materials are relatively coarse grained and have been consolidated by cycles of repeated drought and resaturation.

No geologic impacts, such as settlement, due to groundwater withdrawal are anticipated because the alluvial channel is an unconfined aquifer and the coarse-grained sediments have been subjected to repeated cycles of drought and rewetting.

3.1.2.3 Mitigation Measures

<u>Local Impacts</u>

No impacts were identified relative to local water users. Water use in the Project vicinity is limited to small domestic use and will not be impacted. However, TMC will abide by all conditions of its SWRCB permit to appropriate available water from the Santa Clara River. Furthermore, TMC will implement the Water Shortage Contingency Plan (WSCP) submitted to the SWRCB, Division of Water Rights in the *Answer to Vested Rights Protests vs. Application No. 29967* (West Coast Environmental 1994) presented in Appendix C2 of this EIS.

A significant impact on local sensitive ecological habitats is possible during dry months of dry years if pumping of river underflow continues unabated. TMC has proposed necessary mitigation measures, including a habitat protection plan and the reduction or cessation of pumping, if necessary.

WR1. TMC will conduct a monitoring program for water resources and sensitive ecological habitats in the immediate vicinity of the Project. The habitat protection program will include the following components:

- Four existing monitoring wells, as shown on Figure 3.1.2-5, will be maintained to monitor water levels of the Santa Clara River underflow during the life of the Project.

- Surface flows of the Santa Clara River will be monitored during the life of the Project at a location(s) to be determined in conjunction with responsible agencies prior to the start of mining, and

- the riparian and aquatic habitat in the immediate vicinity of the site will be monitored as detailed in the habitat protection plan presented in Appendix F6.

The habitat protection plan contains action levels that will trigger adjustments to mining operations to reduce Project water consumption to avoid significant degradation of the ecologically sensitive habitats attributable to the Project. Operational adjustments will include one or more of the following:

- seasonal sand and gravel production adjustments through stockpiling materials,
- seasonal management of concrete production,
- stockpiling fines temporarily to eliminate water used in the compaction process,
- increased use of dust palliatives for dust control,
- temporary reduction or cessation of pumping of river underflows, and
- cessation of mining operations, if necessary.

Regional Impacts

No significant impacts on regional water resources were identified; therefore, no mitigation measures are required.

Geologic Impacts

No geologic impacts due to use of water resources, such as liquefaction, soil settlement, or ground swelling, will occur, and no mitigation measures are required.

3.1.2.4 Unavoidable Significant Adverse Effects

The measures proposed above can be feasibly implemented and will reduce the identified impacts to a less-than-significant level. No potential significant unavoidable adverse impacts will remain after mitigation.